

Individual Capacitor Units, For Pole-Mounted, Three-Phase Capacitor Banks, For 7.2 kV Delta or 14.4 kV Solidly-Grounded Wye Systems

Revised 08/2022

Specification

1.0 SCOPE

This specification covers the requirements for single-phase, externally fused capacitor units for use in a three-phase bank shunt connection to a standard distribution system in either a 7.2 kV ungrounded delta or 14.4 kV solidly-grounded wye configuration at 60 Hz.

2.0 APPLICABLE PUBLICATIONS AND STANDARDS

The capacitor units shall comply with the applicable provisions of the latest NEMA, IEEE, ANSI, and IEC standards relating to capacitors. Applicable standards include, but are not limited to:

- 2.1. IEEE Std 18 – Standard for Shunt Power Capacitors
- 2.2. IEEE 1036 – Guide for Application of Shunt Power Capacitors
- 2.3. IEC 60871-1 – Shunt Capacitors for A.C. Power Systems Having a Rated Voltage Above 1,000 V
- 2.4. NEMA CP1 – Shunt Capacitors

3.0 PRODUCT REQUIREMENTS

3.1. General

The capacitors shall conform to the requirements of the standards referenced in Section 2.0 and the specifications herein, for use in the described application in Section 1.0.

3.2. Ratings

3.2.1. Capacitors will be “standard duty” with the following minimum ratings:

System:	7.2 kV Delta	14.4 kV Wye
Capacitor Voltage Rating (L-G)	7200 V	8320 V
Continuous RMS Overvoltage Withstand	110%	
Peak Overvoltage Withstand	120%	
Capacitor kVAR	100, 200 or 300 kVAR	
Capacitance Tolerance	-5% to +10%	
BIL Rating	95 kV	
Ambient Operating Temperature	-40 to +55 degrees C	
Internal Discharge Resistors	Discharge to 50 V within five (5) minutes	
Maximum Fault Current Capability	10,000 A	

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3.3. **Construction**

- 3.3.1. Capacitor units shall be single phase with mounting provisions for a pole mounted rack.
- 3.3.2. Capacitor units shall have a single bushing with a ground stud for use in the 14.4 kV wye system or two bushings for use in the 7.2 kV delta system. Terminals shall have plated bronze parallel groove connectors suitable for #8 AWG solid through #2 AWG stranded conductor, copper or aluminum. All bushings shall be hermetically sealed. Bushings shall be ANSI Gray #70.
- 3.3.3. Bushings shall have animal proof insulating caps.
- 3.3.4. Capacitor units shall be constructed of stainless steel in a rectangular shape and painted ANSI Gray #70. The stainless steel mounting brackets shall be on the narrow sides and left bare to promote positive grounding.
- 3.3.5. The dielectric shall be all film and the dielectric liquid shall be non-PCB. The fluid shall comply with all existing EPA regulations. Each capacitor unit shall have "NON-PCB" decals affixed such that it will be readily visible when installed.
- 3.3.6. All capacitor units shall be shipped with a factory installed shorting shunt between bushing terminals or bushing terminal to ground stud as applicable with no smaller than #8 AWG bare copper or aluminum. Each capacitor unit shall come with an attached weatherproof tag warning that the capacitor is shorted and that the shunt must be removed prior to energization.
- 3.3.7. The manufacturer shall submit the information as listed on the "Power Capacitor Data Sheet" found in Section 5 along with a tank rupture curve report at the time of quotation for the proposed capacitor units.

3.4. **Nameplate**

Each capacitor unit shall be provided with a securely attached stainless steel nameplate containing at minimum the below information, and following all IEEE standard requirements:

- a) Manufacturer's catalog number
- b) Manufacturer's serial number
- c) Manufacture date
- d) Maximum voltage
- e) Impulse voltage (BIL)
- f) Unit capacitance
- g) Total weight

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4.0 TESTING

Certified test reports substantiating compliance with the Standards listed in Section 2.0 shall be furnished upon request.

5.0 POWER CAPACITOR DATA SHEET

The manufacturer or authorized representative shall be required to present the following information at the time of quotation:

- A. Capacitor Ratings:
 - a. Voltage (kV)
 - b. KVAR Capacity (kVAR)
 - c. Bushing Voltage (kV)
 - d. Bushing BIL Rating (kV)
 - e. Number of Bushings per unit
 - f. Dielectric Fluid Volume (Gal.)
 - g. Weight (lbs)
 - h. Actual power loss per IEEE Std. 18 (W)
- B. Capacitor Unit Construction:
 - a. Number of series sections
 - b. Number of parallel sections
 - c. Voltage per section (V)
 - d. Discharge resistor resistance (Megohms)
 - e. Discharge resistor power rating (W)
- C. Capacitor Unit Insulation:
 - a. Number of film sheets per pad
 - b. Total thickness of film pad (mils)
 - c. Thickness of each film sheet (mils)
 - d. Thickness of foil sheet (mils)
 - e. Electric stress across dielectric pad – Dry (V/mil)
 - f. Electric stress across dielectric pad – Wet (V/mil)
- D. Quoted failure rate for units of this rating/design
- E. Exceptions to the specification, if any